A Work Project, presented as part of the requirements for the Award of an International Master Degree in Management from the NOVA – School of Business and Economics.

INTERNAL TRANSFER PRICING SYSTEM IN IMPRENSA NACIONAL CASA DA MOEDA

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3rd January 2018

Abstract

This work project presents a case study that is intended to initiate a process of designing a transfer pricing system in a specific company. The system was studied for a specific department of the company as a model to be extended to the whole organization. Also, a financial performance evaluation model was suggested to assess the contribution of a department, or one of its subdivisions, to the overall results of the organization. The adoption of a transfer pricing system comes from the necessity of the companies to modernize their management accounting practices relying on the idea that decentralizing and accounting lower-level managers with higher responsibilities will lead towards improvements at an efficiency and productivity level.

Keywords: Case Study, Decentralization, Financial Performance, Management Accounting, Transfer Pricing

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I. Introduction

The purpose of this Work Project (WP) consisted in designing a transfer pricing system in a specific organization, a project inserted in the area of management accounting. In this WP, it was adopted the case study as research method. The approach followed to conduct the study was a direct research with internship in the finance department of Imprensa Nacional Casa da Moeda (INCM).

During the late 1980s and early 1990s, traditional management accounting practices were widely criticized (Johnson & Kaplan, 1987; Drury, 2008) and considered, by many authors, as outdated in a way that they were not reflecting accurate cost accounting information and were distorting products and services performance. For that reason, modern management accounting practices were developed. These practices allow companies to be more competitive in an environment that has become more demanding and with a much higher strategic component (*ibid*).

Transfer pricing is in line with these modern management accounting practices. It consists, in a few words, in defining internal prices between departments within the same organization. This allows organizations to organize their departments in responsibility centers that work independently as a "business inside a business" and thus be accountable for its own results. A well implemented transfer pricing system together with an efficient financial performance evaluation avoid the distortion of results due to inefficient costing methods (Rodrigues & Simões, 2012) and creates an entrepreneurial and motivating environment inside the organization giving managers independence over decisions (Drury, 2008; Rodrigues & Simões, 2009).

Since INCM still adopts traditional costing methods and management accounting practices, this WP is intended to initiate a process of improvement through a transfer pricing system for INCM's information systems department as well as develop a financial performance evaluation model to assess its contribution to the organization. This WP is structured in five sections. Section II offers

a literature review of the topics addressed in the case study. Section III outlines the methodology used to carry out the work project. Section IV describes the empirical study developed during the intervention period and section V reports the main conclusions, limitations and recommendations.

II. Literature Review

1. Management accounting: a strategic approach

A management accounting division is today almost a requirement of any organization. It is a means of gathering and using information to coordinate the process of making planned and controlled decisions throughout the organization with a purpose to pursue and achieve the organizational objectives (Horngren et al., 1999). The role of management accounting is today to influence the behavior of managers in a way that will lead to rational decisions, value creation and competitiveness of organizations (Rodrigues & Simões, 2009; Atkinson et al., 2012).

During the late 1980s and early 1990s, traditional management accounting practices were widely criticized and new approaches were already being requested due to the increasingly competitive business environment at that time (Drury, 2008; Johnson and Kaplan, 1987). Managers are aware that the business environment has been evolving in the direction of a decision-making more focused on increasingly demanding customers constantly looking for innovative products to satisfy their needs. This idea must be aligned with a clear strategic mindset with a well-defined vision and mission of the company, encouraging employees' behavior to be consistent with the global strategy. Hugues et al. (2015) believes that, in organizations, there should be management by objectives: lower-level managers being assigned with objectives, either local or global, is a crucial process because an organization without a strategy will have no direction in an environment full of competitive organizations.

Drury (2008) states that strategic management accounting is able to gather external information about competitors and has the goal to find out which strengths can lead to competitive advantage. However, it is important not to disregard that goal congruence must exist since lower-level managers working in their own interest should result in organizational objectives to be achieved successfully (Horngren et al., 1999).

2. Decentralize and give responsibility as a present and future path

Decentralization, also called divisionalization (Drury, 2008), is an organizational structure that does not attribute decision making only to top managers but rather spread the responsibility over all hierarchical levels, with lower-level managers having the power to make their own decisions (Garrison & Noreen, 2002). Decentralization, according to Atkinson et al. (2012), evolved essentially for two reasons: companies became larger and geographically dispersed. In this sense, central decision makers faced great difficulties to make all organizational decisions and transmit information throughout the company. Atkinson et al. (2012) considered these factors as a cause of a natural development in companies to respond quicker and more effectively to their challenges.

Nowadays, a centralized organizational structure can only operate in stable environments (Atkinson et al., 2012). However, organizational processes in companies are never static and organizations are in a constant flux (Horngren et al., 1999) in an environment where markets are volatile and technology is constantly developing. In that sense, attempts in aligning strategy, structure and motivation of employees must be continuous (*ibid*).

It is important to state that decentralization without giving responsibilities to the right people leads to a loose end and does not guarantee that managers will act in the organization's best interest. Rodrigues and Simões (2009) states that it is crucial to account lower-level managers with local objectives in order to guarantee that local and global objectives are being held simultaneously.

Without these principles, motivating and creating involvement of lower-level managers in the company will not work and the strategy of decentralization will be a failure (Hugues et al., 2015).

Decentralization presents, in fact, clear advantages to organizations: lower-level managers have more information about their activity, local conditions and the factors that could affect the performance and this allows them to have better daily performances (Kaplan & Atkinson, 1998; Horngren et al., 1999; Garrison & Noreen, 2002; Brickley et al., 2008; Drury, 2008; Rodrigues & Simões, 2009); also, decentralization relieves top managers of lower-level decisions and allows them to concentrate their, time and energy on global objectives and strategic planning of the entire organization (Kaplan & Atkinson, 1998; Horngren et al., 1999; Garrison & Noreen, 2002; Brickley et al., 2008; Drury, 2008); and, lastly, adding responsibility and decision-making authority to lower-level managers provides greater incentives (Horngren et al., 1999; Garrison & Noreen, 2002) because good managers are ambitious and take pride in their work. Top management restricted instructions may affect their interest in using their talent (Kaplan & Atkinson, 1998).

Although having a decentralized organization seems to bring advantages, it is extremely important to guarantee that local objectives are not achieved to the expense of the global ones (Horngren et al., 1999) especially if lower-level managers are not familiarized with the global strategy (Garrison & Noreen, 2002).

To sum up, well-motivated managers, in a decentralized organization, are more capable of reacting and acting locally in an environment where identifying changes in customer requirements must be done quickly and effectively (Atkinson et al., 2012).

3. Responsibility centers: idea and core concepts

The definition of responsibility centers is well established amongst management accounting authors. A responsibility center is defined as "an organizational unit headed by a manager that is responsible for the achievement of a set of results, meaning objectives, ensuring the exercise of a

set of activities. This unit has a mission and its own objectives and its manager has the power over the resources needed for the achievement of those objectives" (Rodrigues & Simões, 2009: 14).

It is important to clarify, from the onset, that a responsibility center does not mean simply attributing tasks to that center. It is identifying a mission, its goals and the plan of action to follow (Hugues et al., 2015). Garrison and Noreen (2002) add that a responsibility center must be regarded as a small business: the manager can make decisions on costs, revenues and/or investments and is asked to run his own center, pursuing their local goals set by top and lower-level managers.

Responsibility centers are widely classified in cost, result or investment centers regarding the decision rights assigned to the center (Zimmerman, 2002), meaning the degree of power that each manager has over the resources of its division. By way of an example, cost centers are associated with central services that support the company as a whole. Finance or legal departments are divisions that are expected to minimize costs while providing services demanded by the other divisions (Garrison & Noreen, 2002), being its managers only assigned with decisions over the mix of inputs such as labor or materials (Zimmerman, 2002). On the other hand, result centers, where managers are being assigned for input mix, product mix and selling prices (*ibid*), and investment centers, which have an additional decision right for capital expenditures (*ibid*) and the power to negotiate with clients and suppliers (concede or ask for credit, for example), are expected to have responsibility for costs and revenues.

The creation of responsibility centers must be carefully analyzed, evaluating the level of implication that each center has on the whole company. Its incorrect designing may create conflicts between local and global objectives risking the implementation of the overall strategy (Hugues et al., 2015). In fact, there is a danger that divisions compete with each other excessively and that divisional managers may be tempted to increase their own profits at the expense of the profits of

the other divisions (Drury, 2008). In every organization, divisions should not only contribute to the success of the company, but also to the success of other divisions (*ibid*).

Summing up, it is very important that, in an organizational structure consisting of responsibility centers, there is management by objectives and accountability and delegation of authority (Hugues et al., 2015). These authors add that an organization that does not have a clear strategy and well-defined strategic objectives, exhibits a high likelihood of failure. The implementation of responsibility centers, if well-defined and planned, brings several advantages to the company, orientating for the performance evaluation of divisions including non-financial measures and promoting the alignment of the operations to the strategy, as well as, an entrepreneurial environment within lower-level managers (Rodrigues & Simões, 2009).

4. Performance evaluation in responsibility centers

A decentralized organization structured in responsibility centers needs a set of rules, measures and rewards that are compatible with overall corporate goals (Kaplan & Atkinson, 1998), meaning that it must have a good, clear performance evaluation, otherwise top management would not be able to analyze the performance of each division. Financial parameters, such as profits, are always the first ones analyzed because they have a general application and a direct relationship with results (Kaplan & Atkinson, 1998; Hugues et al., 2015), and articulate directly with the organization's, almost always purely financial, long-term objectives (Kaplan & Atkinson, 1998).

In this sense, Rodrigues and Simões (2012) believe that the best approach to a financial evaluation of the performance of a responsibility center, namely an investment center, is the residual contribution margin, which goes against the arbitrary cost allocation based on inefficient allocation criteria. This approach consists in, besides costs and revenues, attributing, to each center, the costs resulting from the application of capital on the economic asset (Rodrigues & Simões, 2012). The economic asset of a center is defined as the sum of tangible and intangible assets within

the decision-making power of its manager and the working capital needed to negotiate payment and receipt conditions and having stocks of products. Rodrigues and Simões (2012) explains that these costs will be valued through a cost of capital rate, computed based on the organization's structure of capital. This optic of reaching each center's contribution to the global organization is a very useful and important tool for top management to understand which centers are creating value, based on a performance evaluation reached only through direct costs, avoiding any distortion of results due to inefficient indirect cost allocation (Rodrigues & Simões, 2012).

However, it is important to mention that financial measures, today, are not enough. Hugues et al. (2015) states that it is not sure that cost reduction strictly leads to an increase in the overall results, meaning it can be done to the expense of not hiring specialized human resources or not buying the most efficient equipment, for example. In that sense, companies must also focus on non-financial measures such as employee's satisfaction, response time, respect for the organization's ethical and environmental commitment (Atkinson et al., 2012) or competitiveness, quality and delivery performance (Drury, 2008) because these are the ones that "motivate managers to avoid sacrificing long-run performance for short-run performance gains" (Atkinson et al., 2012: 493).

The balanced scorecard, a modern management accounting tool already widely used as a way of communicating strategy and empowering decision making, is an example of an approach that maintains financial performance measures but supplements these with measures along customer, internal processes, and learning and growth dimensions (Kaplan & Atkinson, 1998; Kaplan & Norton, 2001).

5. Responsibility centers and the need for an emergence of a transfer price

In decentralized organizations, it is a regular practice to use transfer prices to coordinate actions and to evaluate divisional performance (Horngren et al., 1999). An internal transfer price is defined to value a certain transaction of a good or service between divisions within the same organization

(Hugues et al., 2015). The transfer price will result in a cost for the client division and a revenue for the supplier division, influencing the profitability of both (Drury, 2008). International Accounting Standard 14 was established to explain and recommend the adoption of segment reporting, meaning reporting financial information by segment or division.

From a historical perspective, "transfer pricing has always been a practical issue, even though more academic effort has been expended on building theoretical models than on studying and explaining practice" (Emmanuel & Mehafdi, 1994: 34). Transfer pricing has traditionally been treated as a cost-revenue problem disregarding organizational, managerial or strategic dimensions of the organizations (*ibid*). Although academic studies were conducted before, only during the 1960s, was there an increase in the trend towards decentralization and the adoption of the concept of strategy (*ibid*). From that time on, although information on company practices was scarce, it became clear that "transfer pricing is not really a mere technical problem which can easily be solved by a clever cost formula, but is rather an issue of strategy, structure, technology and human behavior" (*ibid:* 47).

The definition of a transfer price is based on a few rules that must be followed to ensure that it is well implemented and that organizational goals are not at risk. Firstly, there must be a clearly identified and tradable product or service (Hugues et al., 2015) and, secondly, the "rules of the game" must be explicit for both parties, meaning the transfer price must be set before any decision (*ibid*). Besides that, there are some principles that help a correct implementation of transfer pricing. Firstly, both the supplier and client unit must agree on the terms of the transaction and its price (*ibid*). Also, Garrison and Noreen (2002) and Hugues et al. (2015) defend the idea that top management intervention should be reduced to the minimum possible, only assuring that it won't have negative implications on the overall organization, otherwise the purpose of decentralization would be abandoned. Furthermore, Kenney (2017) says that top managers should be cautious

because conflict of interests might occur between divisions and, as managers and employees are often compensated based on the divisional profit, this process can affect the overall profit of the organization negatively. A reward system including the organizational performance level will be seen with good eyes by the managers. Moreover, the client unit must always have the right to decide whether to buy or not internally (Hugues et al., 2015) and if a manager chooses not to, the organization must respect the decision taken (Garrison & Noreen, 2002).

Yet, the idea is that a well implemented transfer price system would lead to prices that motivate both divisions to transact internally in conditions where the organization would be the one that benefits the most. Hugues et al. (2015) state that defining transfer prices between divisions will drive the managers to start worrying about competitiveness and be motivated to meet deadlines and quality and productivity requirements, leading to improved financial results for the whole organization. Besides that, it still promotes a fair performance evaluation for the divisions, which will be monitored with similar performance measures.

Multinational companies are often decentralized in the way that enables country managers to make decisions that exploit their knowledge of local business and political conditions (Horngren et al., 1999). In that sense, the weight of tax issues and tax planning resulting from transacting internally or externally increases a lot. Actually, one objective of transfer pricing is intentionally moving profits between divisions or locations (Drury, 2008) and, in that sense, organizations use transfer pricing for tax minimization (Emmanuel & Mehafdi, 1994). However, this subject is very complex and requires a much deeper investigation beyond the topic addressed in this document.

6. Characteristics and methods of reaching transfer prices

Transfer pricing is a management accounting technique utilized to allocate jointly earned revenue among responsibility centers, affecting to each center the correct result (Atkinson et al., 2012). As it was already mentioned, transfer pricing is consistent with the spirit of decentralization.

In that sense, Hugues et al. (2015) says that a transfer price should meet three critical characteristics. Firstly, it should be simple, meaning that if it is not understandable for all the managers, its objectives will not be achieved. Secondly, already pointed out but hugely important, every action on the part of lower-level management must be in the best interest of the organization. And, thirdly, it must reflect a measure of a fair performance evaluation. Hugues et al. (2015) still add that the prices must be stable for some time for the managers to have a plan of action. As transfer price affects the profitability of both divisions, both divisional managers should know how this price is determined (Kaplan & Atkinson, 1998) before the occurrence of the transactions.

Authors specialized in the field divide the methods to fix transfer prices into cost-based methods, market-based methods and negotiated prices. The chosen transfer pricing method should lead managers to make optimal decisions in the interest of the organization (Horngren et al., 1999).

Cost-based methods, as the name says, set the transfer price based on the costs incurred by the supplier center. In this case, it can be based on actual costs, meaning that the client center only knows the product or service price after the supplier center does its report. This is the worst scenario because the supplier side is always going to be paid whatever the costs incurred (Hugues et al., 2015). The client center is going to pay for the efficiencies or inefficiencies of the supplier and the latter does not have any incentive or motivation to become more efficient (*ibid*). The alternative cost-based method is the standard cost: the transfer price is reached through a structured process of cost prevision based, most of the time, on budgeted costs (*ibid*). This method is much better in the sense that the client center has previous knowledge of the cost they need to support and both sides will be much more motivated to be efficient.

The other two methods are considered to be the best alternatives for reaching the transfer price, each one under specific conditions, since computing costs in an accurate and reliable way to figure out a transfer price is a big challenge (Atkinson et al., 2012). Emmanuel and Mehafdi (1994) states

that when alternative uses of intermediate products exist and lower-level managers are free to agree with other, the company can earn financially since the profits of the responsibility centers can change. On the other hand, if there is not a feasible alternative, transfer pricing acts simply as a cost allocation between the centers (Hugues et al., 2015).

When there is a highly competitive market for the product, which has the characteristic of having identical or similar products or services, the market price is the most appropriate transfer price (Kaplan & Atkinson, 1998) and it is the way in which it is more likely to represent the real economic contribution of the division to total company profits (Drury, 2008), being free of manipulation from the supplier division (Brickley et al., 2008). Surveys have consistently documented company practices of market-based transfer pricing, even though the scenario of perfectly competitive markets does not seem descriptive of most products (Baldenius & Reichelstein, 2006). If the divisions assume the transfer price from a highly competitive market as given, then it would be completely indifferent to buy or sell outside. However, internal transactions are encouraged by means of a reduction from market price reflecting "savings on selling and collection expenses and the delivery, service, or warranty terms associated with external sales" (Kaplan & Atkinson, 1998: 455). The same authors refer, however, that sometimes external companies deviate from the market price, for example to gain a market share, and this violates the market assumptions and can lead to an incorrect market price.

A third approach is referred to negotiated prices. When the market does not fit the conditions of perfect competition, where the price of inputs and outputs depends upon the quantities purchased and sold (Hass, 1968), as it usually is not for most manufactured goods, the transfer price problem becomes more complicated (Kaplan & Atkinson, 1998). In this approach, lower-level managers are free to negotiate between themselves and the negotiated price ends up being the result of a bargaining process between the concerned divisions (Horngren et al., 1999). Basically, the client

division may accept the deal, bargain to obtain a lower price or better conditions or negotiate with external suppliers. On the other hand, the production division can then bargain with the client division or talk to existing customers in the market (Kaplan & Atkinson, 1998).

Although the process seems to be easy, negotiating transfer prices is time consuming and can produce conflicts among divisions (Brickley et al., 2008) since competitive threats do not only exist among independent suppliers but also within divisions from the same organization (Ronan & Balachandran, 1988). Top management must be careful because it depends a lot on the negotiation skills of both parties that can leave behind economic considerations (Horngren et al., 1999).

Drury (2008) believes that if bargaining power is equal for both divisions and managers are competent, they will make decisions that maximize the profits of the company as a whole, and, even if it does not result in an optimum output level, "the motivational advantages of giving managers full independence over their input and output decisions may lead to increased profits that outweigh the loss of profits negotiated non-optimal transfer prices" (Drury, 2008: 509) as it offers desirable mechanisms for local managers to exploit the information they possess about local conditions and opportunities (Kaplan & Atkinson, 1998). Edlin and Reichelstein (1995) confirm this by believing that negotiated prices, along with a divisional profit measurement, create the desirable managerial incentives at the divisional level.

7. Transfer price definition for market-based methods

As it was mention, when a highly competitive market exists, the market price should be the reference for the process. After adjusting the price in a way that reflects the difference between the internal and external market, a transfer price will arise with benefits for both divisions.

If the market has imperfections and top management allows the divisions to negotiate between them, the process of reaching the transfer price is quite intuitive. Hugues et al. (2015) explains that each responsibility center has to take into account the price that it is going to receive or pay by the

external market and any opportunity cost or benefit that would come from that transaction. After making that reasoning, each responsibility center should reach an indifference price, in which it is completely indifferent to buy or sell internal or externally. The interval between each indifference price is the negotiation range, meaning that any value within that interval would benefit both centers (Seal et al., 2000) as the supplier center would receive more than it would receive in the market and the client center would pay less than it would pay in the same market. It is important to recall that indifference prices and its adjustments should be the responsibility of lower-level managers, with only occasional support from top management that have the responsibility of overseeing the negotiation (Kaplan & Atkinson, 1998).

8. Transfer pricing in central services

Central services, meaning divisions that provide services demanded by the whole organization, require a special treatment regarding the transfer pricing issue. These divisions are usually classified and treated as discretionary cost centers (Kaplan & Atkinson, 1998; Garrison & Noreen, 2002; Hugues et al., 2015). These departments are expected to minimize cost while providing the level of products or services demanded by the rest of the organization (Garrison & Noreen, 2002).

Hugues et al. (2015) mention that these centers have to be treated differently due to two reasons: firstly, there is great difficulty in measuring their activity since there is not a valid unit of production for those services and, secondly, because of some lack of congruence of objectives that might exist as some costs may be incurred in order to achieve a greater quality service and the organization cannot measure with clarity the advantages that would come from them. These authors reinforce this idea by giving a clear example: what would be the advantage of the accounting department closing its accounts five days early knowing that the organization would need extra human resource hours? It is, in fact, difficult to quantify the benefits of these situations.

This difficulty appears because the relationship between inputs and outputs is weak and organizations are not able to evaluate if a central department is operating efficiently (Kaplan & Atkinson, 1998). Companies control such departments only by monitoring the amount of resources provided, such as human resources and equipment, rather than by the outcomes they achieve (*ibid*) and their financial evaluation is based on the comparison between actual and budgeted costs, since service quality is largely based on feedback from the other divisions (Hugues et al., (2015). For all these reasons, Kaplan & Atkinson (1998) stated that top management prefer to have the best disciplined people, that take pride on the quality of the service, managing central services.

Summarizing, defining transfer prices for central services has traditionally been a problem due to the extreme difficulty in valuing these services (Hugues et al., 2015). However, Zimmerman (2012) believes that the transactions that take place inside, because of repetitive internal contracting, are cheaper than outsourcing. The same author adds that, even if identical services are cheaper externally, producing internally can still be advantageous as it provides greater quality control, more timely supply and greater protection of proprietary information.

III. Methodology

This WP consisted of developing a case study investigation through direct research within an internship which began on October 11th, 2017, in the finance department of the organization studied, Imprensa Nacional Casa da Moeda (INCM). In accounting research, case studies are being increasingly considered as a research method (Ryan et al., 2002). This case study fell into the category of an illustrative case study defined as a means to "illustrate new and possibly innovative practices developed by particular companies" (*ibid*: 143), in a logic of an interventionist research.

An interventionist research is defined as a "longitudinal case study approach in which active participant observation is used deliberately as a research asset" (Suomala et al., 2014: 305). Such

a perspective enables the researcher to understand the actions of the coworkers in the field and observe processes and outcomes of the operations as well as having the possibility to communicate and act together with them (Jönsson & Lukka, 2005). The researcher, participating actively in the real-time course of events is more able to gather high quality research materials for further analysis (Suomala et al., 2014). "Interventionist research is typically problem-solving oriented and therefore seeks to produce change in the host organization" (Jönsson & Lukka, 2005: 39), aiming to influence the organization towards improvement while producing theory contribution balancing between "the pure logic of academia and the practical logic of the field" (Jönsson & Lukka, 2006: 381).

Following the main steps in an interventionist research, the first step taken by the researcher was to investigate the historical background of the company, its current issues (Jönsson & Lukka, 2005) and to gain an understanding of its situation since a good design of the intervention can only be built on a good understanding of the problem to be solved (*ibid*).

During the intervention period, as the researcher conducted his study in real-time, observation was an important part in the collection of empirical research materials. Other research materials were collected from meetings, interviews, regular conversations or the study of internal documents. Regular informal meetings were done in a context of information sharing and work updates and a field diary was built to compile this information (Appendix 1). Crossing information from the various meetings helped the researcher to stay on the right track and draw his conclusions.

The process of evaluating the benchmark, the last section of the case study, was done, mostly, through internal documentation, considered by the researcher as the best reference to proceed its work. This documentation is referred mostly to official documents in which external organizations are proposing to perform services in INCM as outsourcing companies. INCM, as a public entity, opens public tenders for external companies when extra labor hours are required in specific jobs and independent companies submit their application. Then, the purchases department evaluates the

proposals based on specific criteria and the best one results in an outsourcing contract. This case study gathered proposals since 2015. It is important to refer that counseling by people specialized in the area of information systems was crucial to ensure that the values reached were close to reality.

The main research question of the WP is, as implied, how to define, in practice, an internal transfer pricing system in a specific organization.

IV. Case Study

1. Imprensa Nacional Casa da Moeda

Imprensa Nacional Casa da Moeda (INCM) is a Portuguese public company. It is of significant importance in the Portuguese economy, mainly, through a close relationship of trust with the Portuguese Public Administration, to which INCM provides, exclusively, some products and services essential to citizens and to life in society. It also responds to a fundamental and increasingly valued need by citizens, companies and contemporary states, security, being recognized at a national level as a leader in security products and services. It is considered the oldest manufacturing establishment of the Portuguese State with activities dating back to the thirteenth century. Today INCM has the responsibility to "develop, produce and provide products and services which require the incorporation of high security standards as a guarantee of its authenticity and reliability" (INCM 2015 Management Report: 193), preserving the Portuguese language and culture.

INCM is comprised of four business units, with different products, services and purposes. With the slogan "The Value of Security", the security printing area is the most important one as it is responsible for the production of distinct products and services with emphasis on the production and delivery of identification documents for the Portuguese Public Administration such as citizen

cards and passports. On the private sector, it also has an important role in the production of cards, forms and stamps with high levels of security, a great part for the banking sector.

The other most relevant area of activity and the most ancient one is the currency production and minting. The minting of the current currency is one of the main sources of revenues and depends on the needs of the Bank of Portugal, being, afterwards, put into circulation. Apart from this, it also includes minting of collection coins sold to Portuguese and foreign companies and to society and currency production for other entities, such as the Dutch National Bank.

With smaller expression in the overall activity of INCM, the publications area and the assay offices are the remaining business units. In the first one, the company is responsible, primarily and most importantly, for the publication and edition of the "The Official Portuguese Journal" (Diário da República) where one can find "all the legislation and jurisdictional acts, (…) any acts of an administrative nature, jurisdictional documents and public and private contracts" (INCM Official Website). Still in this area, INCM does the edition and publication of special works of the Portuguese language and culture, namely the complete works of historically relevant Portuguese writers and poets known worldwide. Assay offices, on the other hand, play a role in the regulation and certification of precious metals in Portugal. Their main purpose is "assuring its authenticity, the consumer's protection and a fair competition between the different economic agents involved" (INCM 2015 Management Report: 65). It has the final goal of avoiding counterfeiting and assuring the quality of every piece in Portuguese territory. Appendix 2.1 shows the relevance of each business unit through the percentage of its activities.

To support these business units, the company has organized itself in thirteen structural departments divided into support and corporative functions including, for example, the finance department, in which the researcher did his intervention, and the information systems department, the object of study. INCM's organogram is visually represented in Appendix 2.2. As illustrated

above, INCM operates in very particular sectors of activities being submitted to several risks, such as the trend of the Portuguese Public Administration to open the market for the production of products and services that had been, historically, exclusive to INCM.

2. INCM's information systems department

The information systems department (ISD) is classified, within the structure of the organization, as a function of support. The ISD is the unit responsible for all the support to the company's information systems that, in an organization of this dimension, is extremely important. The department organizes itself into four operative subdivisions coordinated by the department's direction. Those four subdivisions are the security products development (SCD), client service (CS), application's management and development (AMD) and infrastructure and security (I&S). Appendix 2.3 visually shows the structure described above.

INCM, operating in very particular sectors of activity, provides a significant part of its products and services to public entities. For that reason, some of them are exclusive to the organization and no other entity is authorized to produce them, such as document personalization which has numerous security standards that require certain certifications. Although it requires a significant period to adapt to the specifics of the business, when the services are not exclusive, there are some outsourcing contracts in place to support the ISD's functions, some of which are discussed and analyzed throughout this empirical study.

3. Information systems department services

ISD is classified, according to the literature review, as a discretionary cost center. However, ISD's services have a clear unit of production and, therefore, a price per hour could be analyzed. The ISD has, today, a defined service catalog splitting its activities in twelve distinct services. Although in this catalog each service category is associated with one single subdivision, the information provided is that, in practice, the department functions as a whole and the subdivisions

take advantage of the synergies, with a considerable part of the services done in collaboration of two or more subdivisions. Appendix 3.1 lists the services and their general description.

Furthermore, due to the lack of human resources to carry out some of the services that the ISD is required to provide, external collaborators are hired temporarily under outsourcing contracts. As an example, the service client subdivision, in the provision of the helpdesk service to INCM's employees, which had in the past been done by elements of INCM, today works with three external collaborators under an outsourcing contract carefully coordinated by INCM. It is important to mention that the costs of subcontracting services in the information systems area are being directly imputed to the division that requested the service. However, in the perspective of internal transfer pricing, costs of subcontracting external employees fall within the ISD's costs. In this case, it has no direct influence on the calculation of transfer prices.

After a careful analysis of ISD's services and meetings with department heads, four service packages under study were closed. Notice that the choice was based on three criteria: the services may be contracted in the market, being market-based methods accepted for transfer price definition; their relevance for INCM's activities, being this empirical study focused on the service packages critical for INCM and requiring more fieldwork; and, thirdly, the services must be repeatedly requested and not a one-time service. It is important to clarify that the services exclusive to INCM and impossible to be outsourced, should be, in a perspective of transfer pricing, computed under the standard cost method. The four service packages are briefly described below. Appendix 3.2 further details the service and describes its relevance for INCM and Appendix 3.3 shows the service flux from the supply area to the client area(s).

Service 1 – Helpdesk Service

The INCM's helpdesk service is a resource that provides in-house computer help to support the organization's activities and provide guidance and assistance to its employees. It includes

interventions in portals, logins and accesses, e-mail, communications, Microsoft Lync, work stations and data recuperation-level assistance. The service is provided by the ISD to all the business units and the support and corporative functions.

Service 2 – Printing Support Service

The service that the ISD provides at the printing level is purely an information systems service, not involving any intervention on malfunctioning of the printers. The service includes maintenance, configuration and access management of regular printers, guaranteeing that they are functional for everyone. Regular printers include corporate and industrial printers, but exclude a set of very complex industrial printers that have a specialized team responsible for their maintenance. The support to corporate printers is provided to the whole organization and the support to industrial printers to the security printing business unit.

Service 3 – SAP System Support Service

SAP is an enterprise software application used worldwide that incorporates key business functions with integrated, online and real-time information. Every transaction is recorded in the SAP system, denominated the "infrastructure of the whole organization". The support to the system is a service supplied by the ISD and it is transversal since it is provided to all the business units and the corporative and supporting functions.

Service 4 – Support Service to the Electronic Official Portuguese Journal

The ISD has in its hands the function to develop and manage the internal and external portals. The most relevant is the Electronic Official Portuguese Journal, a product developed for the Portuguese State where all legislation is disclosed. It is a public service of universal and free access and one of the main products of INCM. Since 2007, when became electronic, the ISD has been responsible for content updates, resolving anomalies, managing the access and making

developments if needed. The support to the portal is provided for the publication business unit that is responsible for the Official Portuguese Journal.

4. Current imputation method of the information systems department costs

In INCM, all the thirteen structural departments are classified as cost centers. This means that the performance analysis is exclusively based on costs being them direct and mostly direct labor, supplies and external services, depreciations and amortizations and internal maintenance costs. Posteriorly, the method of imputing these structural costs to the business units is done by very traditional criteria: weight of sales or number of workers. This method of absorbing costs is considered by Rodrigues and Simões (2009) as an approach that highly distorts the results of the business units by a means of an arbitrary imputation disclaiming the structural departments for their costs and ignoring any analysis of value creation of these departments (Rodrigues & Simões, 2012). Internal investigations have already identified the inefficiency of this approach that overcharges business units and products with more weight in the organization.

5. Responsibility center definition and classification

Considering the process of defining internal prices discussed previously in the literature review, it requires a prior identification and classification of responsibility centers.

Concerning the ISD's activity, each subdivision could be considered a responsibility center. However, as explained, subdivisions do a shared job, intervening simultaneously in service provision. For that reason, it is very difficult to quantify the effort made by each subdivision in one service, and, without this information, the individual residual contribution margin (next section) would not be accurate. In that sense, the researcher's decision was to define one responsibility center for the whole ISD. This decision came along with the fact that the economic asset associated with the department is not totally distributed by the subdivisions: there are items common to all and reflecting a significant amount, impacting the individual value creation analysis. Notice that,

in the researcher's opinion, it would make total sense to subdivide the performance analysis into smaller responsibility centers to assess which ones are doing better or worse. However, the researcher considered that he did not have enough information to perform this analysis.

In terms of classification, it required an evaluation of the degree of power that the department has over its resources. To analyze this matter, two issues were addressed. On the one hand, regarding the working capital management, namely average payment and receipt deadlines, the ISD does not have the power to intervene, being the purchases department responsible for this matter. On the other hand, as far as decisions about purchasing equipment are concerned, it is the ISD that is accountable for requesting the necessary equipment and, for that reason and, considering the reviewed literature, the ISD must be classified as an investment center, being its manager accountable for costs and revenues and also for investment decisions.

6. Information Systems Department performance evaluation model

Considering the literature review, the residual contribution margin is seen by Rodrigues and Simões (2009, 2012) as the best approach to assess the performance of a responsibility center. The residual contribution margin does not impute any cost to any center other than strictly direct costs and, for that reason, is able to compute the real contribution of each center to the organization's overall results. It is a cost and revenue analysis followed by the addition of financial expenses computed from the department's economic asset and the organization's cost of capital rate, discussed in the following sections. The transfer prices defined later in this report will be the revenue component of the model. Since, today, INCM's structural departments are evaluated only through costs, "internal revenues" were not being considered and value creation could not be assessed. The performance evaluation model for the ISD, considering an investment responsibility center, is visually represented in Appendix 4.1.

6.1 Information systems department's economic asset

The ISD's economic asset is represented by the sum of the department's immobilized assets and the operational working capital. As previously mentioned, the ISD has no power over decisions on working capital and, for that reason, it was not considered within this analysis. In that sense, the ISD's economic asset corresponds to the immobilized assets, whose acquisition has been decided by its director. The economic asset considered for performance evaluation purposes was the expected net value of the ISD's immobilized asset by the end of December 2017 plus any immobilized asset that was expected to be acquired until that date and INCM's building net immobilized asset weighted by the area of the ISD's (approximately 1,5%). Notice that the value concerning the ISD's segment of the building was included because restructuring works and matters relating to the security of physical space are under the decision power of the department. Appendix 4.2 provides the description and value of the ISD's economic asset.

6.2. INCM's (weighted average) cost of capital

Each organization finances its assets through a financing strategy that combines sources from shareholders' equity and external debt that can be reflected in a single rate, denominated cost of capital. As small deviations in a company's cost of capital can alter results significantly, it must be carefully analyzed, through past information and future expectations, to represent the most approximate value that is expected to represent the INCM's capital structure.

Appendix 4.3 aggregates relevant financial information of INCM's past eleven years. However, due to legal requirements, INCM was forced to change its capital structure towards the elimination of external debt, which rended this information unreliable for this purpose. Today, with the authorization of the state bank, the Portuguese Treasury and Debt Management Agency, INCM can already be financed by commercial banks but it is not. In that sense, the finance department agreed that a representative cost of capital should be reached considering the real values of 2015 and 2016 and the provisional values for the years 2017, 2018 and 2019, collected from 2017's plan

of activities and budget - see Appendix 4.4. Notice that the same financial information for the current year was not yet available. As can been seen in Appendix 4.4, the percentage of equity is approximately 71%. However, non-current liabilities do not include any medium or long-term debt. They are composed by provisions, post-employment benefit obligations, deferred tax liabilities and deferrals. This means that, in the calculation of INCM's cost of capital, the weight of the liabilities is zero and, intuitively, as INCM does not have any interest expenses, the cost of debt is also zero. The consequence is that the cost of capital matches the cost of equity. The cost of equity, already computed in INCM in the scope of a project by the financial department, was updated by the researcher for the year 2017. The final value of INCM's cost of capital was defined as 14.64%. Appendix 4.5 and 4.6 present the calculation and the assumptions made in the different components.

6.3 Financial expenses

Financial expenses represent the average cost of financing the economic asset. Its value is reached through a simple calculation considering the value of ISD's economic asset and INCM's cost of capital. Appendix 4.7 visually shows how the final value of €282.552 was reached.

7. Transfer prices definition

According to the literature review, a transfer price based on the market requires the analysis of the benchmark and the conditions of the service provision to determine which price is the best to represent the organization's interests. Benchmark analysis and transfer price definition for each service are developed in the next two subsections.

7.1 Benchmark analysis

The benchmarking process is widely used by organizations today as a means of external analysis of market practices in the search for opportunities to improve. Appendix 5 explains how the market price was found and makes a small reference to the aim and content of the projects consulted for

services 3 and 4. For the four service packages, a price per hour was reached. It is important to mention that all figures are presented without value-added tax (VAT).

7.1.1 Helpdesk service's benchmark analysis

For the helpdesk service, INCM already has an outsourcing contract in place, contracting three extra full-time collaborators to provide in-house assistance, which serves as reference to the market price. As explained in the methodology, INCM opens public tenders for other companies for the provision of one service. In this service, in which are demanded very specific requirements, the analysis of the proposals concerning this specific contract is the best reference for the market price since the organizations, when applying, are aware of the conditions and terms of the contract. In this sense, an average price of the organizations' financial proposals of the last contract was considered by the researcher as a very reliable indicator of the market price. The market price accepted for the helpdesk service was €11,87.

7.1.2 Printing support service's benchmark analysis

The printing support service followed different procedures. Today the service is done internally by the ISD's human resources. However, in conversation with the head of the division responsible for the service, it was concluded that it could be incorporated in the helpdesk service. It became evident at the meeting that this particular service is not, at the moment, provided by the helpdesk team for security reasons. The helpdesk team integrates outsourced collaborators and they were not granted access to the servers as confidentiality issues would require a lengthy bureaucratic process. In that sense, the researcher was told that €11,87, the price charged for an hour of the helpdesk service, was a good reference of the market price.

7.1.3 SAP support service's benchmark analysis

Regarding the SAP support service, the ISD is forced to outsource extra labor hours for some of its projects due to the low number of human resources. The benchmark analysis followed the same

reasoning as service 1. However, this service is not so specific i.e. it does not refer to a long-term outsourcing contract with several requisites but to the development of shorter occasional projects. In this context, it is not enough to analyze a single project since, even when they are considered as SAP support services, these projects have different characteristics and the prices may differ because of their particularities. So, as a means of getting a reliable standard market price, the researcher decided to analyze all the projects, crossing information from fifteen proposals from eight different projects since 2015. When compiling all the information, the researcher paid attention to the possible increase in the price over the years but the evidence did not show any significant conclusion. The market price reached for an hour of this service was €35,94, computed through the average price of the fifteen proposals. This was considered a very good market price indicator since, with a 95% level of confidence, the hourly prices fell under the range of €34,14 and €37,74.

7.1.4 Electronic Official Portuguese Journal support service benchmark analysis

As for the Electronic Official Portuguese Journal support service, the ISD also establishes some occasional outsourcing contracts to help the management of the portal due to lack of human resources and, in a few cases, for further programming expertise. The benchmark analysis of the service followed very similar procedures as the SAP support service through the analysis of different projects. However, in this service, projects seem to differ more in terms of aim and content, with the service prices being slightly different from project to project, the average of the all prices is expected to give a good reference of what the market price is: besides project A, the remaining contractual prices were very close to each other. The market price for an hour of the service is €42,88, which is expected to be quite a reliable figure since, with 95% level of confidence, prices per hour are between €36,99 and €48,77. Notice that the same analysis in price increases was conducted and no significant conclusions were reached.

7.2 Recommended transfer price value

In the logic of transfer pricing, the market price discussed above needs to be adjusted to reflect the differences between an internal or externally provided service. Adjustments to deadline terms, commissions, discounts, default risk and travelling fees were studied. Firstly, information gathered inside the organization supported the idea that there should be no extra commission for the provision of this type of service; regarding travelling expenses, they certainly exist. However, the common practice among companies in the metropolitan area of Lisbon, when big amounts are contracted, is not to charge those expenses if the service is provided within the area of the city. When required to make longer journeys, companies charge in general €0,40/km, according to Ordinance no. 1553-D/2008, of December 31, published in the Official Portuguese Journal. This ordinance defines the maximum amount that a company can deduct, for tax purposes, in travelling allowances. Companies, in that sense, usually charge their clients in the same proportion as they pay their employee, that is, they charge the client the same amount that, by law, they pay their employee. This information is in accordance to the documents consulted. Considering that the ISD operates mostly in Lisbon, travelling expenses were considered to be zero. Nevertheless, the researcher is aware of their existence; when considering possible discounts that the supplier center might save, the researcher has not left out the possibility of the existence of prompt payment or quantity discounts. However, no evidence was found in this regard, and, for that reason, no solid conclusion could be reached; risk of default is, generally, ignored in transfer pricing analysis.

The price adjustment came down to incorporate the payment and receipt terms. From a client center perspective, the indifference buying price is lower than the market price, since the client center is not willing to pay as much as in the market because it will lose the possibility of having an extended payment deadline. On the other hand, the supplier center, the ISD, is willing to sell the service for a lower price because it will "receive the money" immediately.

As far as payment and receipt conditions are concerned, when there are specific proposals for the provision of the service, the average of the deadlines for each service can be reached and those numbers are expected to be the best reference for that specific service. Notice that this value was computed by averaging the deadlines weighted by the respective contract values to incorporate the different level of importance of each contract. Appendix 5 shows the respective final values.

As a recommendation, if there was no existing market reference for deadlines, the researcher suggests the use of the average deadline, disclosed by the Bank of Portugal, for organizations with the ISD's characteristics. For this matter, the ISD falls under the classification of small organizations taking into account the Commission Recommendation of 6 May 2003 concerning the classification of enterprises, published by EUR-Lex and its activity falls under the Economic Activity 620 - computer consulting and programming and related activities. The corresponding deadline for the ISD is 66 days. Notice that this figure was not incorporated in any calculation.

Whenever deadlines are referred, it means both payment and receipt deadlines since the payment deadline granted for INCM as a client center is considered to be equal to the receipt deadline granted by the ISD to their customers. Since the payment and receipt deadlines are the only relevant conditions, the indifference prices match and that is the internal transfer price that should be adopted. Appendix 6 shows these adjustments and presents the recommended transfer price.

7.2.1 Helpdesk service's transfer price

As seen in Appendix 5.1., the average deadline is 53,69 days. Considering this information, the internal transfer price that should be adopted for an hour of the helpdesk service is €11,61.

7.2.2 Printing support service's transfer price

The average deadline, following the reasoning for the market price analysis, is considered to be the same as the helpdesk service, 53,69 days. In this sense, the internal transfer price recommended for an hour of the service is €11,61.

7.2.3 SAP support service's transfer price

Appendix 5.3.1, shows that the average deadline for the SAP support service is 44,1 days. In this sense, the internal transfer price recommended for an hour of the service is €35,30.

7.2.4 Electronic Official Portuguese Journal support service's transfer price

The average deadline, in days, for the service is 56,93 days, as it is shown in Appendix 5.4.1. The internal transfer price recommended is, therefore, €41,89 per hour.

Appendix 7 shows the model incorporating all the figures discussed in this empirical study.

V. Conclusions, Limitations and Main Recommendations

This WP intended to start a process of improvement in the management accounting systems of Imprensa Nacional Casa da Moeda. The research was conducted in accordance with the literature review developed for the WP, which was based on the idea that decentralizing and giving responsibility to lower-level employees has positive impacts on the overall efficiency of the organization. Transfer pricing is in line with these thoughts and the main goal was to initiate the design of an internal transfer pricing system for the information systems department with the aim of extending it to all the business units and structural departments in the future.

Four internal transfer prices which were expected to represent the best interest for INCM were defined and a performance evaluation model was developed with the purpose of incorporating internal revenues from transfer prices and assessing the value creation of a responsibility center.

While doing the empirical study, the researcher was aware that the particularities of the area of information systems may have made the interpretation of the services difficult but believes that the conclusions that this WP provide are very trustworthy. Still important to mention, since INCM is a public company, the process of finalizing an outsourcing contract requires a long period of time and effort by the INCM employees. This aspect is very relevant and the researcher knows that it

impacts the value of the transfer prices because the difference between the client centers simply asking for the service internally or being involved in a process of subcontracting externally is very significant. However, that was not possible to quantify and it was not considered in this empirical study. It is important to mention, though, that it most probably would increase the buyers' indifference price and decrease the transfer price. Also, as mentioned in the case study, the researcher is aware of the existence of other factors that might affect the final transfer price. However, no solid conclusion could be reached due to lack of information, namely in the travelling expenses and discount issues. A final limitation of this WP concerns the impossibility of the researcher to design the system to assess the contribution of each ISD's subdivision for the overall results. As already mentioned, it should be in the interest of INCM to make this analysis and it should be considered in further research. However, the way that the ISD operates nowadays makes it very difficult to subdivide the individual performance of its subdivisions, mostly due to the impossibility of isolating individual efforts in the provision of the services.

Summarizing, it is clear that modern management accounting techniques have resulted in significant improvements in the management of organizations in terms of competitiveness and evaluation of internal efficiency and product profitability. In this sense, the main recommendation goes towards reinforcing the idea that this WP should be the beginning of a long process that should culminate in a transfer pricing system covering the four business units and the thirteen structural departments, able to assess which ones are creating or destroying value and correct inefficiencies.

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A Work Project, presented as part of the requirements for the Award of an International Master Degree in Management from the NOVA – School of Business and Economics.

INTERNAL TRANSFER PRICING SYSTEM IN IMPRENSA NACIONAL CASA DA MOEDA

APPENDIX

GONÇALO FILIPE MENDONÇA MARQUES DONATO #3513

A Project carried out on the International Master in Management Program, under the supervision of: Associate Professor Maria João Major

3rd January 2018

Appendix

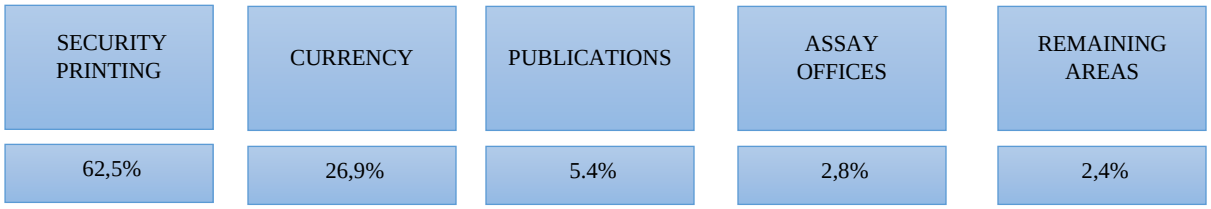
Appendix 1 – Field diary

Field Diary - Summary of Main Informal Meetings		
Date	**Subject**	**Participants**
12-10-2017	Introduction and discussion of possible WP themes	Maria João Major; Carlos Silva; Inês Ferreira
11-10-2017	Beginning of the internship (beginning of empirical study)	
11-10-2017	Work update and empirical study plan of action	Maria João Major
13-10-2017	Introduction to the organization's activities and costing practices	Inês Ferreira
18-10-2017	Discussion of the ISD's activities and its organization	Inês Ferreira
19-10-2017	Development of following working steps for the researcher and work updates	Maria João Major; Carlos Silva; Inês Ferreira
19-10-2017	Presentation of ISD's services and discussion of a plan of action of information collection	Carlos Silva; Inês Ferreira; Diogo Lopes
24-10-2017	Discussion of the ISD's services and understanding of its particularities	Sofia Pires; Fernando Ramos
26-10-2017	Discussion of the ISD's services and understanding of its particularities	Sofia Pires
02-11-2017	Development of following working steps for the researcher and work updates	Inês Ferreira
07-11-2017	Clarification of some aspects of the SAP system	Tiago Catarino
07-11-2017	Work updates; Closing of the service packages studied	Inês Ferreira
10-11-2017	Discussion of the strategy of benchmark analysis	Inês Ferreira
13-11-2017	Explanation and provision of outsourcing proposals	Pedro Cardoso; Susana Nunes
15-11-2017	Explanation and provision of outsourcing proposals	Susana Nunes
20-11-2017	Explanation and provision of outsourcing proposals	Lina Paula
20-11-2017	Clarification of some aspects and work updates	Inês Ferreira
21-11-2017	Provision of the final outsourcing proposals	Susana Nunes
24-11-2017	Clarification of some aspects and work updates	Inês Ferreira
24-11-2017	Explanation of the incorporation of printing support service in the helpdesk service	Inês Ferreira; Jorge Sousa
27-11-2017	Work updates and discussion of the final points	Inês Ferreira
28-11-2017	Work updates and discussion of the final points	Inês Ferreira
28-11-2017	End of empirical study	

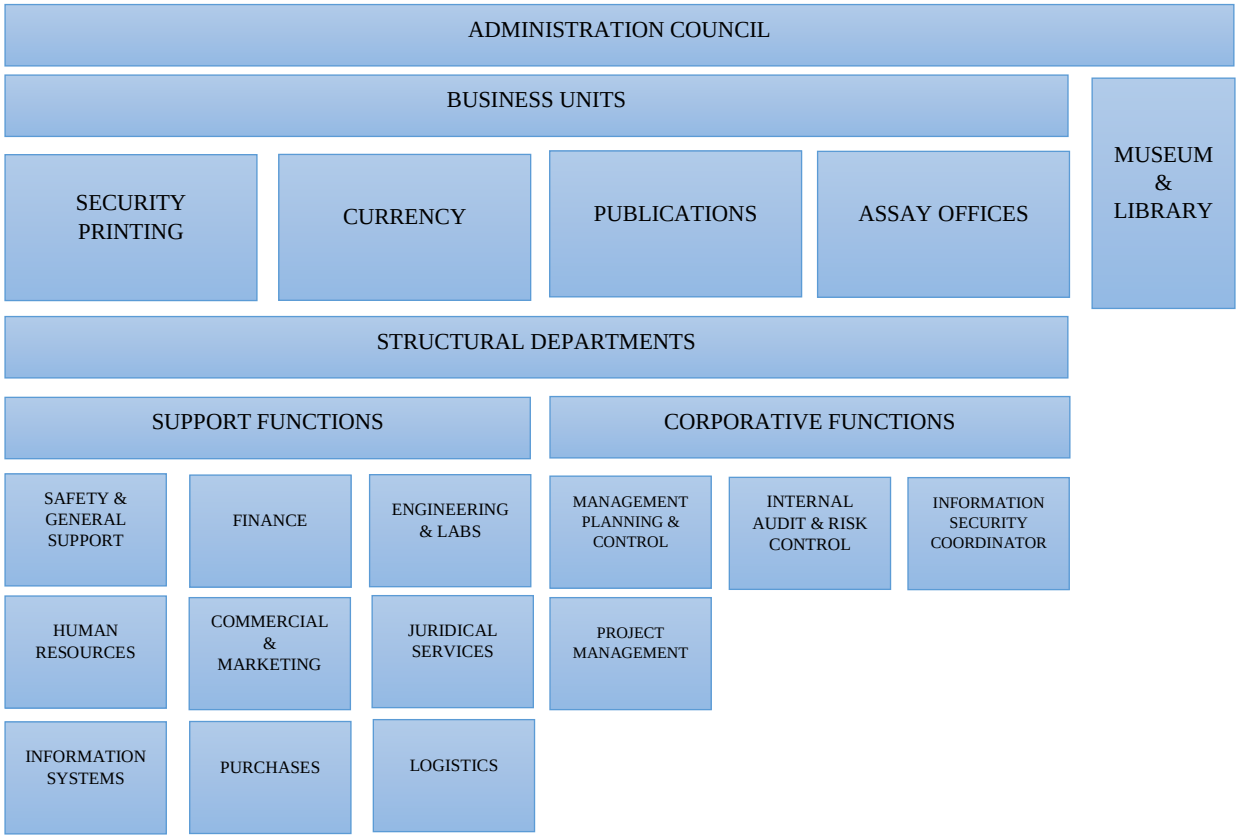
List of Participants	
Maria João Major	Nova SBE's Work Project Supervisor
Carlos Silva	INCM's Finance Director
Inês Ferreira	Internship Supervisor & INCM's Head of Financial and Management Accounting Division
Diogo Lopes	INCM's Information Systems' Department Director
Sofia Pires	INCM's Head of Information Systems' Client Service Subdivision
Fernando Ramos	INCM's Head of Information Systems' Security Products Development Subdivision
Tiago Catarino	INCM's Collaborator of the Project Management Office
Pedro Cardoso	INCM's Purchases Department Director
Susana Nunes	INCM's Collaborator of the Purchase Department
Lina Paula	INCM's Collaborator of the Purchase Department
Jorge Sousa	INCM's Head of Information Systems' Application's Management and Development Subdivision

Appendix 2 – Imprensa Nacional Casa da Moeda

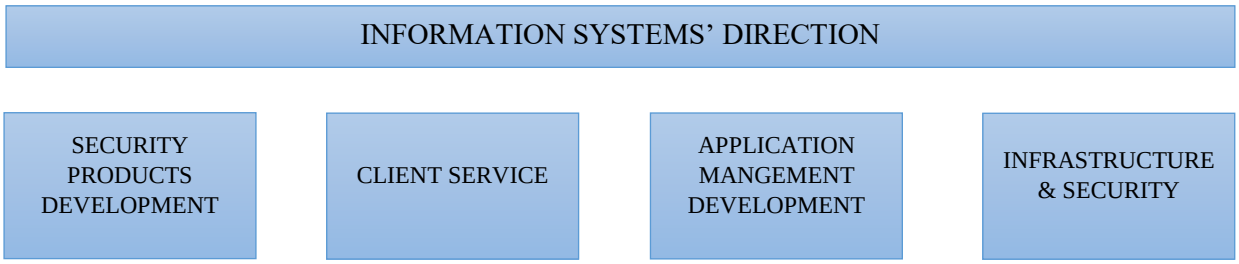
Appendix 2.1 – Imprensa Nacional Casa da Moeda's activity per business unit (business volume, 2016)



Appendix 2.2 – Imprensa Nacional Casa da Moeda's organogram



Appendix 2.3 – Information systems department organogram



Appendix 3 – Information systems department (ISD)

Appendix 3.1 – List of services and general description

Services	General Description	SPD	AMD	CS	I&S	INCM
Document Personalization	Resolving errors and info requests					Excl.
INCM Portals	Resolving errors, logins, updates and info requests					Non-Excl.
Work Stations	Acquisition, installation, activation, maintenance, repairs and anti-virus					Non-Excl.
Login & Accesses	Creation, removal, configuration and unlock logins and access management					Non-Excl.
E-mail	Operations in mail box, distribution lists and release of retained e-mails					Non-Excl.
Communications	Operations in points of network, telephones, internet, hotspots, VPN and firewalls					Non-Excl.
Printers	Accesses, maintenance, assistance, configuration of industrial and corporative printers					Non-Excl.
Lync	Creation, removal and changes of users					Non-Excl.
Data Recuperation	E-mails and files recovery					Non-Excl.
Physiscal Spaces	Rooms preparation and support					Non-Excl.
Digital Certificates	Digital certificates production					Non-Excl.
Corporative Applications	Resolving errors, info requests and development of corporative applications					Non-Excl.

SCD-Security Products Development; AMD-Application Management Development; CS-Client Service; I&S-Infrastructure & Security
Excl. - Exclusive; Non-Excl. – Non-Exclusive

Appendix 3.2 – Detailed description of the studies services

<u>Helpdesk Service</u>

- Characterization of the service: corporate and business service
- Contextualization and description of the service: The INCM's helpdesk service is a resource that provides in-house computer help to support the organization's activities and provide guidance and assistance to the organization's employees. It follows a regular format of a service desk where INCM's employees open requests that, depending on the level of urgency, are solved by ISD's human resources. It includes interventions in portals, logins

and accesses, e-mail, communications, Microsoft Lync, work stations and data recuperation-level assistance.

- Relevance for INCM: Regarding the number of employees that INCM currently employs, the proper functioning of information systems is critical for the organization since the majority of its operations is registered and shared in real time across all the divisions and organizational-level information is disclosed internally through information systems. The helpdesk service team is tasked to solve any incident that might occur on the information system.
- Internal clients to where it is provided: All the support functions, corporative functions and the business units currently use this service.
- Other relevant information: INCM has an outsourced team of employees that work daily in INCM, coordinated by the INCM's head of information systems' client service subdivision. INCM's helpdesk already has a standard outsourcing contract with several requisites. There must be three resources working directly with INCM on a 9 a.m. to 8 p.m. schedule. Each resource is demanded to have an ITIL certification and solid knowledge of computers, ADM systems and databases knowledge as well as a clean criminal record. INCM usually makes three-year contracts with annual renewals and asks for a set of sixty extra hours to be used outside schedule.

Printing Support Service

- Characterization of the service: corporate and business service
- Contextualization and description of the service: The industrial printing support service includes the maintenance, configuration in the servers and access management of regular printers. This service does not include the maintenance of some very complex industrial printers that have a specialized team for that effect. The ISD's intervention involves the

corporate printers used for administrative purposes and some industrial printers that can be managed by similar processes. It refers, exclusively, to an information systems service, meaning that it does not include any intervention on the malfunctioning of the software on any other component of the printers.

- Relevance for INCM: The production of documents with security standards is, by far, the business area with more weight in INCM's results. Industrial printers are, in that sense, very sensitive equipment and, in case of error or breakdown, can lead to serious consequences. For example, the printing of the identity documents issued by the Portuguese State, which often has short deadlines, is INCM's main source of revenue. Corporate printers also have their importance on the overall daily operations especially in the administrative areas and their proper functioning is critical.
- Internal clients to where it is provided: The corporate support service is provided by the ISD to every business unit or support and corporative functions. On the other hand, support on the industrial printers is done to the security printing business unit.
- Other relevant information: The ISD, today, provides this service internally. It is the ISD's human resources that are responsible for the installation and configuration of the printers and ensure their operation on a daily basis.

SAP System Support

- Characterization of the service: corporate and business service
- Contextualization of the service: SAP is an enterprise software application used worldwide that incorporates key business functions with integrated, online and real-time information. In INCM, the system used is mostly SAP ERP – SAP enterprise resource planning – where all the company's logistics, human resources, financial and other operations are registered daily, functioning as the infrastructure of the organization.

- Relevance for INCM: SAP support is translated into one of the most relevant ISD's services since a malfunction of the system can generate entropies in INCM's operations and cause problems at an organizational level. The support to SAP system works on two different levels, the technical support for daily operations and development of projects. The information collected and assumed to represent reality was in the sense that a labor hour has the same price for both services and they are considered as one.

SAP System Technical Support

- Description of the service: This service refers to ISD's support in resolution of incidents and response to requests. Incident resolution means responding to system errors in the daily operations such as problems with inventory in warehouses, issuing/printing delivery notes or poorly recorded values. The response to requests refers, for example, to access or management of passwords.
- Internal clients to where it is provided: The service is transversal to the whole organization provided to all the business units and the corporative and support functions.
- Other relevant information: Internally, about ten people are allocated to this service trying to solve almost all the rapid interventions.

SAP System Development of Projects

- Description of the service: The SAP system is constantly being updated and, in INCM, development requests are made through the implementation of projects, usually involving many hours of work, which can be directed to an improvement of the system or to the creation of new functionalities, for example the project of implementing the system in the assay offices being currently in the finishing phase. Since this system is a tool through which all INCM's operations pass, it is expected that these development projects have a great impact on an organizational level.

- Internal clients to where it is provided: The service is transversal to the whole organization provided to all the business units and the corporative and structural functions.
- Other relevant information: As mentioned, about ten people are allocated to this service internally. However, when projects are more extensive, external collaborators are outsourced to work in partnership with the ISD.

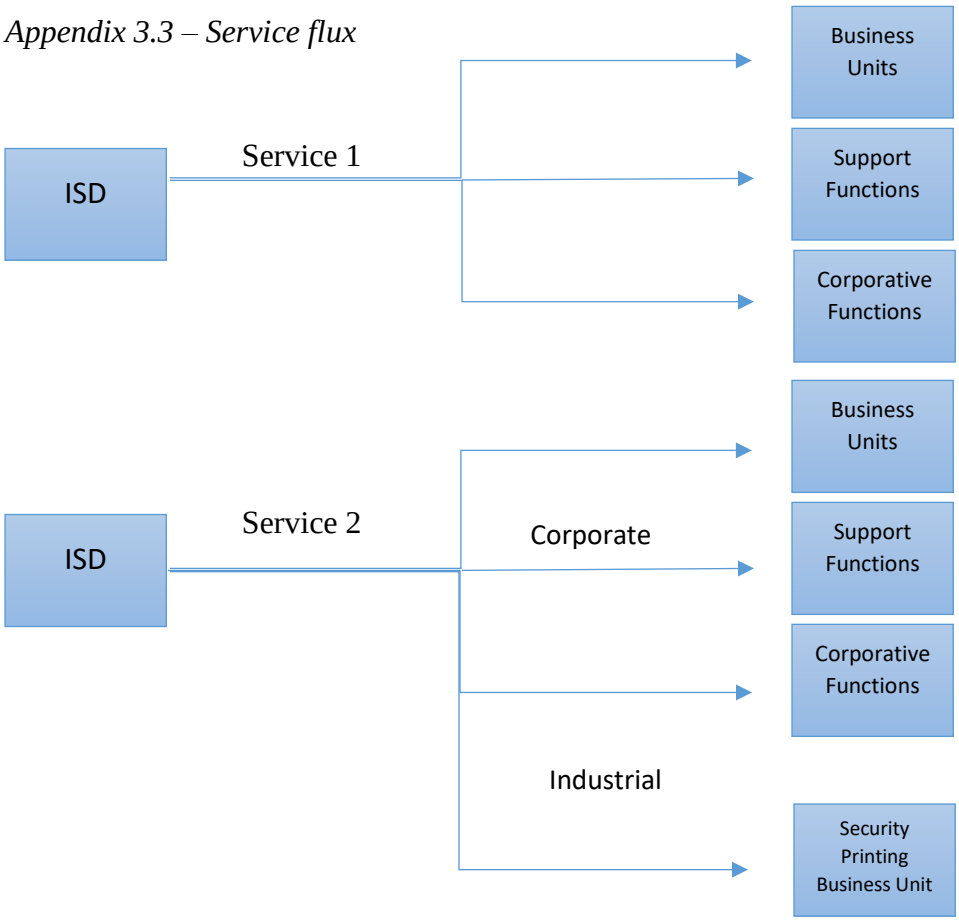
Service Support to Electronic Official Portuguese Diary

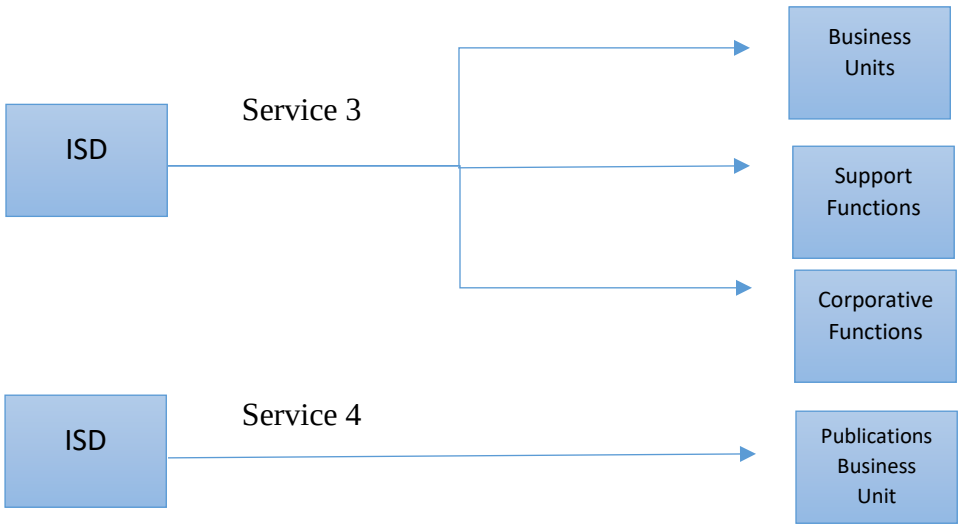
- Characterization of the service: business service
- Contextualization and description of the service: This service is the most relevant service under the service category of portals and one of the most important services provided by the ISD. The ISD intervenes in the Electronic Official Portuguese Diary Portal in case of any unavailability or anomaly, logins and access management and information requests. The ISD is also responsible for possible developments in the portal and its content updates. Since this is a matter of national interest, it is a sensitive service that requires a special treatment.
- Relevance for INCM: The trend for the world to become increasingly digital, forced, in a positive way, INCM to become digital. Having digital web portals for external clients allows INCM to show and advertise its products and make them more accessible. The publications business unit, although not being the most relevant area for the company's overall results, is extremely important, mostly, due to the Official Portuguese Journal where "all the legislation and jurisdictional acts (…) any acts of an administrative nature, jurisdictional documents and public and private contracts" (INCM Official Website) are available. INCM is the entity exclusively responsible for the publication and edition of Official Portuguese Journal, its electronic version being a public service of universal and

free access. The ISD has a very important role, especially since it started to be disclosed electronically in 2007.

- Internal clients to where it is provided: The ISD provides this service directly to the publications business unit, the area responsible for the Official Portuguese Journal.
- Other relevant information: The ISD usually allocate four collaborators to portals management, meaning that the number of hours for providing this service is, frequently, not enough. To this end, external outsourced collaborators are occasionally hired mostly when specific development operations or updates on the portal require a number of hours that the ISD is not able to offer. Since 2015, there were hired five sets of hours were hired under outsourcing contracts to support the Electronic Official Portuguese Journal service.

Appendix 3.3 – Service flux





Appendix 4 – Information systems department performance evaluation

Appendix 4.1 - Information systems department performance evaluation model

Information Systems' Department	in Euros
Revenues	(1)
Services Provided	
Internal Services	
Department X	
Service 1	
Service 2	
Service 3	
Service 4	
Department Y	
Service 1	
Service 2	
Service 3	
Service 4	
Department Z	
Service 1	
Service 2	
Service 3	
Service 4	
Other Departments	
External Services	
Costs	(2)
Direct Costs	
Direct Labor	
Supplies and External Services	

Depreciations	
Other Direct Costs	
Contribution Margin	(3) = (1) – (2)
Financial Expenses	(4)
Residual Contribution Margin	(5) = (3) – (4)

Appendix 4.2 – Information systems department's economic asset

ISD's Immobilized Asset	ISD (Common)				SCD				SC				AMD				I&S				INCM				Total	
31st December 2017	AC	D	ON	NT	AC	D	ON	NT	AC	D	ON	NT	AC	D	ON	NT	AC	D	ON	NT	AC	D	ON	NT	AC	NT
Class of Immobilized Asset A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Class of Immobilized Asset B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Class of Immobilized Asset C	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Class of Immobilized Asset D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Class of Immobilized Asset E	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Class of Immobilized Asset F	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Class of Immobilized Asset G	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Immobilized Asset	2,06 M				0,07 M				0,74 M				4,07 M				1,37 M				0,54M				8,83 M	
Total Net Immobilized Asset	1,43 M				0,01 M				0,008 M				0,02 M				0,02 M				0,16M				1,93 M	

AC-Acquisition Cost; D-Accumulated Depreciations; ON-Order Notes; NA-Net Amount
Note: The sum of the subdivisions do not match the total value because there were made approximations due to confidentiality issues.

Total ISD's Area	382 m^2
Total INCM Building's Area	24735 m^2
% Area Associated with ISD	1,5444%

Appendix 4.3 – INCM's Capital Structure for the past 11 Years

	CAPITAL STRUCTURE FROM PAST 11 YEARS							
	2006		2007		2008		2009	
Equity	83.370.607,00 €	46,65%	88.097.579,00 €	50,43%	89.017.038,00 €	54,67%	96.659.870,00 €	67,14%
Net Income	6.956.794,00 €		4.726.972,00 €		4.701.037,00 €		11.403.661,00 €	
Shareholder Return on Equity	8,34%		5,37%		5,28%		11,80%	
Current Liabilities	-		-		-		-	
Non-Current Liabilities	-		-		-		-	
Total Liabilities	95.331.424,00 €	53,35%	86.586.234,00 €	49,57%	73.823.058,00 €	45,33%	47.313.448,00 €	32,86%
Total Liabilities and Equity	178.702.031,00€	100,00%	174.683.813,00€	100,00%	162.840.096,00€	100,00%	143.973.318,00€	100%

	CAPITAL STRUCTURE FROM PAST 11 YEARS							
	2010		2011		2012		2013	
Equity	107.875.816,00 €	59,18%	112.457.648,00 €	59,37%	117.454.093,00 €	69,59%	123.066.726,73 €	76,15%
Net Income	14.965.919,00 €		26.074.266,00 €		16.717.235,00 €		14.512.950,81 €	
Shareholder Return on Equity	13,87%		23,19%		14,23%		11,79%	
Current Liabilities	58.538.030,00 €	32,11%	35.792.585,00 €	18,90%	18.649.832,00 €	11,05%	10.794.174,56 €	6,68%
Non-Current Liabilities	15.862.929,00 €	8,70%	41.154.279,00 €	21,73%	32.673.825,00 €	19,36%	27.741.597,00 €	17,17%
Total Liabilities	74.400.959,00 €	40,82%	76.946.864,00 €	40,63%	51.323.657,00 €	30,41%	38.535.771,56 €	23,85%
Total Liabilities and Equity	182.276.775,00 €	100%	189.404.512,00 €	100%	168.777.750,00 €	100%	161.602.498,29 €	100%

	CAPITAL STRUCTURE FROM PAST 11 YEARS					
	2014		2015		2016	
Equity	87.567.000,00 €	66,99%	92.874.000,00 €	71,82%	96.301.000,00 €	72,52%
Net Income	17.537.000,00 €		19.992.000,00 €		20.040.000,00 €	
Shareholder Return on Equity	20,03%		21,53%		20,81%	
Current Liabilities	13.385.000,00 €	31,02%	11.448.000,00 €	8,85%	12.549.000,00 €	9,45%
Non-Current Liabilities	29.759.000,00 €	68,98%	24.988.000,00 €	19,32%	23.946.000,00 €	18,03%
Total Liabilities	43.144.000,00 €	33,01%	36.436.000,00 €	28,18%	36.495.000,00 €	27,48%
Total Liabilities and Equity	130.711.000,00 €	100%	129.310.000,00 €	100%	132.796.000,00 €	100%

Average Capital Structure From Past 11 Years	Equity	Total Liabilities
	63,14%	36,86%

Appendix 4.4 – Relevant INCM's capital structure

	RELEVANT CAPITAL STRUCTURE					
	2015		2016		2017	
Equity	92.874.000,00	71,82%	96.301.000,00	72,52%	90.029.889,00	70,32%
Net Income	19.992.000,00		20.040.000,00		20.947.580,00	
Shareholder's Cost of Capital	21,53%		20,81%		23,27%	
Current Liabilities	11.448.000,00	8,85%	12.549.000,00	9,45%	16.709.749,00 €	13,05%
Non-Current Liabilities	24.988.000,00	19,32%	23.946.000,00	18,03%	21.289.709,00 €	16,63%
Total Liabilities	36.436.000,00	28,18%	36.495.000,00	27,48%	37.999.458,00 €	29,68%
Total Liabilities and Equity	129.310.000,00	100%	132.796.000,00	100%	128.029.347,00 €	100,00%

	CAPITAL STRUCTURE PAST 11 YEARS			
	2010		2011	
Equity	107.875.816,00 €	59,18%	112.457.648,00 €	59,37%
Net Income	14.965.919,00 €		26.074.266,00 €	
Shareholder's Cost of Capital	13,87%		23,19%	
Current Liabilities	58.538.030,00 €	32,11%	35.792.585,00 €	18,90%
Non-Current Liabilities	15.862.929,00 €	8,70%	41.154.279,00 €	21,73%
Total Liabilities	74.400.959,00 €	40,82%	76.946.864,00 €	40,63%
Total Liabilities and Equity	182.276.775,00 €	100%	189.404.512,00 €	100%

**The non-current liabilities refer to provisions, post-employment benefit obligations, deferred tax liabilities and deferrals involving no long term debt and therefore no interest expenses (cost of debt equals 0%).*

Relevant Capital Structure	Equity	Total Liabilities
	70,73%	29,27%

Appendix 4.5 – INCM's cost of capital

$$k = \frac{Equity * \ Cost\ of\ Equity + Liabilities * Cost\ of\ Debt * (1 - t)}{Total\ Equity\ and\ Liabilities}$$

$$k = 100\% * 14{,}64\% + 0\% * \ 0\%$$

$$k = 14{,}64\%$$

Appendix 4.6 – Cost of equity

$$Cost\ of\ Equity = R_f + MRP * \beta$$

$$Cost\ of\ Equity = 0.0540 + 0.0924 * 1$$

$$Cost\ of\ Equity = 14{,}64\%$$

Assumption on Cost of Equity Components	
Assumption	Description
R_f = 5,40%	For the risk-free rate, it was calculated through a monthly average of the 10-year Treasury bond yield for the last 10 years.
MRP = 9,24%	For the market risk premium, the figure used was the correspondent equity risk premium for Portugal. This figure was consulted in a document, lastly updated in January 2017, and considered as reference for this purposes: Country Default Spreads and Risk Premiums, by Aswath Damodaran, finance professor in the New York University Stern School of Business.
β = 1	The systematic risk, β, considered for INCM as a public company, was 1.

Appendix 4.7 – Financial expenses

$$Financial\ Expenses = Economic\ Asset * INCM's\ Cost\ of\ Capital$$

$$Financial\ Expenses = €1.930.000 * 14.64\%$$

$$Financial\ Expenses = €282.552$$

Appendix 5 – Benchmark analysis

Appendix 5.1 – Helpdesk service's benchmark analysis

Helpdesk Service's Benchmark					
	Contract Price	Number of Resources	Monthy Total Number of Hours	Price per Hour	Payment Deadline (in days)
Company X	-	3	504	11,70 €	60
Company Y	-	4	504	8,53 €	60
Company Z	-	3	504	11,80 €	60
Company W	-	3	504	14,84 €	60
Company S	-	3	504	12,50 €	30
Simple Average				11,87 €	
Weighted Average*					53,69

**The payment deadline (in days) was computed through an average of the deadlines weighted by the respective contract values to incorporate the different level of importance of each contract.*

Appendix 5.2 – Printing support service's benchmark analysis

Note: The benchmark analysis for the printing support service was conducted above.

Appendix 5.3 – SAP support service's benchmark analysis

Appendix 5.3.1 – SAP support service's market price analysis

SAP System Support Service's Benchmark				
	Contract Price	Contractual Number of Hours	Price per Hour	Payment Deadline (in days)
Company A	-	260	34,45 €	30
Average Project A	-		34,45 €	30
Company B	-	640	35,00 €	30
Company C	-	640	36,00 €	30
Company D	-	640	36,87 €	30
Average Project B	-		35,96 €	30
Company E	-	290	34,45 €	60
Average Project C	-		34,45 €	60
Company F	-	460	34,78 €	60
Company G	-	460	43,26 €	60
Average Project D	-		39,02 €	60
Company H	-	240	37,50 €	N/A
Average Project E	-		37,50 €	N/A
Company I	-	248	38,75 €	30
Company J	-	248	40,00 €	N/A
Average Project F	-		39,38 €	30
Company K	-	5850	29,97 €	30
Company L	-	5850	33,60 €	N/A
Company M	-	5850	33,60 €	60
Company N	-	5850	30,84 €	N/A
Average Project G	-		32,00 €	45
Company O	-	240	40,00 €	30
Average Project H	-		40,00 €	30
Simple Average			35,94 €	
Weighted Average*	-			44,1

**The payment deadline (in days) was computed through an average of the deadlines weighted by the respective contract values to incorporate the different level of importance of each contract.*

Appendix 5.3.2 – Statistical information on SAP support service's market price

Statistical Information		
Average	Standard Deviation	95% Confidence Interval
35,94 €	3,56 €	[34,14€ ; 37,74€]

Appendix 5.3.3 – General description of SAP support projects

	Aim of the Project	Year
Project A	Acquisition of a set of hours SAP-ABAP programming in outsourcing	2017
Project B	Acquisition of a set of hours SAP-ABAP programming in outsourcing	2016
Project C	Acquisition of a set of hours SAP-ABAP and SAP-HCM programming in outsourcing	2017
Project D	Acquisition of a set of hours for assessment services to the SAP platforms in INCM	2016
Project E	Acquisition of a set of hours in SAP	2016
Project F	Acquisition of a set of hours for consultancy in SAP/BI	2015
Project G	Acquisition of a set of hours for SAP implementation	2017
Project H	Acquisition of a set of hours for identification of performance improvements in project SAP-RH	2016

Appendix 5.4 – Electronic Official Portuguese Journal support service's benchmark analysis

Appendix 5.4.1 - Electronic Official Portuguese Journal support service's market price

Support Service to the Electronic Official Portuguese Journal's Benchmark				
	Contract Price	Contractual Number of Hours	Price per Hour	Payment Deadline (in days)
Company A	-	252	27,10 €	60
Company B	-	573	28,92 €	60
Average Project A	-		28,01 €	60
Company C	-	1016	49,11 €	60
Company D	-	1190	45,84 €	60
Average Project B	-		47,48 €	60
Company E	-	160	46,40 €	30
Company F	-	160	46,87 €	30
Company G	-	160	43,50 €	30
Company H	-	160	46,88 €	30
Average Project C	-		45,91 €	30
Company H	-	2080	34,65 €	60
Company I	-	1120	62,42 €	60
Average Project D	-		48,53 €	60
Company J	-	60	40,00 €	30
Average Project E	-		40,00 €	30
Simple Average	-		42,88 €	
Weighted Average*	-			56,93

**The payment deadline (in days) was computed through an average of the deadlines weighted by the respective contract values to incorporate the different level of importance of each contract.*

Appendix 5.4.2 – Statistical information on Electronic Official Portuguese Journal support service's market price

Statistical Information		
Average	Standard Deviation	95% Confidence Interval
42,88 €	9,97 €	[36,99€ ; 48,77€]

Appendix 5.4.3 – General description on Electronic Official Portuguese Journal support projects

	Aim of the Project	Year
Project A	Acquisition of a set of hours of 24*7 Support to the Electronic Official Portuguese Journal	2016
Project B	Acquisition of a set of hours of load tests for the Electronic Official Portuguese Journal	2016
Project C	Acquisition of a set of hours for supporting the system of submission and edition of acts in the Electronic Official Portuguese Journal	2016
Project D	Acquisition of a set of hours for development services of the Electronic Official Portuguese Journal legal consolidation module	2015
Project E	Acquisition of a set of hours for maintenance of the Electronic Official Portuguese Journal app	2017

Appendix 6 – Transfer prices' definition

Appendix 6.1 - Helpdesk service's recommended transfer price

ISD (Supply Division)		Department X (Client Division)	
Service Market Price (per Hour)	11,87€	Service Price (per Hour)	11,87€
Saving Costs of Deadline Benefits granted to Costumers $(11{,}87€ * 14.64\% * \frac{53{,}69}{360})$	- 0,26€	Lost of Deadline Benefits granted by Suppliers $(11{,}87€ * 14{,}64\% * \frac{53{,}69}{360})$	- 0,26€
Lost of the Travelling Fee charged to Costumers	- 0.00€	Savings on Travelling Fees	- 0.00€
Other Costs or Savings	0,00€	Other Costs or Savings	0,00€
Supplier's Indifference Price	11,61€	Client's Indifference Price	11,61€

Appendix 6.2 – Printers support service's recommended transfer price

ISD (Supply Division)		Department X (Client Division)	
Service Market Price (per Hour)	11,87€	Service Price (per Hour)	11,87€
Saving Costs of Deadline Benefits granted to Costumers $\left(11{,}87€ * 14{,}64\% * \frac{53.69}{360}\right)$	- 0,26€	Lost of Deadline Benefits granted by Suppliers $\left(11{,}87€ * 14{,}64\% * \frac{53.69}{360}\right)$	- 0,26€
Lost of the Travelling Fee charged to Costumers	- 0.00€	Savings on Travelling Fees	- 0,00€
Other Costs or Savings	0,00€	Other Costs or Savings	0,00€
Supplier's Indifference Price	11,61€	Client's Indifference Price	11,61€

Appendix 6.3 – SAP support service's recommended transfer price

ISD (Supply Division)		Department X (Client Division)	
Service Market Price (per Hour)	35,94€	Service Market Price (per Hour)	35,94€
Saving Costs of Deadline Benefits granted to Costumers $(35{,}94€ * 14.64\% * \frac{44.1}{360})$	-0,64€	Lost of Deadline Benefits granted by Suppliers $(35{,}94€ * 14.64\% * \frac{44.1}{360})$	-0,64€
Lost of the Travelling Fee charged to Costumers	- 0.00€	Savings on Travelling Fees	- 0.00€
Other Costs or Savings	0,00€	Other Costs or Savings	0,00€
Supplier's Indifference Price	35,30€	Client's Indifference Price	35,30€

Appendix 6.4 – Electronic Official Portuguese Journal service's support recommended transfer price

ISD (Supply Division)		Department X (Client Division)	
Service Market Price (per Hour)	42,88€	Service Price (per Hour)	42,88€
Saving Costs of Deadline Benefits granted to Costumers $(42{,}88€ * 14.64\% * \frac{56.93}{360})$	- 0,99€	Lost of Deadline Benefits granted by Suppliers $(42{,}88€ * 14.64\% * \frac{56.93}{360})$	- 0,99€
Lost of the Travelling Fee charged to Costumers	- 0.00€	Savings on Travelling Fees	- 0.00€
Other Costs or Savings	0,00€	Other Costs or Savings	0,00€
Supplier's Indifference Price	41,89€	Client's Indifference Price	41,89€

Appendix 7 – Final information systems department performance evaluation model

Information Systems Department	in Euros
Revenues	(1)
Services Provided	
Internal Services	
Department X	
Service 1	11.61€ * Working Hours
Service 2	11.61€ * Working Hours
Service 3	35.30€ * Working Hours
Service 4	41.89€ * Working Hours
Department Y	
Service 1	11.61€ * Working Hours
Service 2	11.61€ * Working Hours
Service 3	35.30€ * Working Hours
Service 4	41.89€ * Working Hours
Department Z	
Service 1	11.61€ * Working Hours
Service 2	11.61€ * Working Hours
Service 3	35.30€ * Working Hours
Service 4	41.89€ * Working Hours
Other Departments	-
External Services	-
Costs	(2)
Direct Costs	-
Direct Labor	-
Supplies and External Services	-
Depreciations	-
Internal Maintenance	-
Other Direct Costs	-
Contribution Margin	(3) = (1) – (2)
Financial Expenses	(4) 282.552€
Residual Contribution Margin	(5) = (3) – (4)